Management Control Strategies in Global Supply Chains: a Comparative Study of Chinese Service Outsourcing Firms

Introduction

Despite the rich literature on global value chains (GVC) (Gereffi et al. 2005) and global production networks (GPN) (Henderson et al. 2002)[1], our understanding is still limited about how firms, especially supplier firms, organise their work and employment to meet competitive challenges in global production networks and requirements from clients (Yeung & Coe 2015). This is, to a large extent, due to the fact that GVC/GPN analysis tends to focus mainly on the *inter*-firm power relations in the chain/network, whilst paying little attention to the implications of these linkages for the internal dynamics of supplier firms, particularly in relation to the organisation of work and employment at workplaces (Smith et al. 2002)

There have been a number of recent efforts to fill this gap. Coe & Yeung (2015), for example, have emphasised that the strategic choices of firms in global production networks shape processes of intra-firm coordination as well as inter-firm relations. They state that 'we allow for the possibility of actors in the *same* global production networks exercising multiple….types of firm-level strategy' (p.126). They relate this variability to differences in corporate culture, institutional setting, ownership, industry dynamics and technological trajectories. In dealing with the pressures on costs, quality and timing, supplier firms draw on and develop their existing resources to manage their internal processes. Central to this is an understanding of how supplier firms organise their labour.

Indeed, bringing labour back into the analysis of GVC/GPN has recently been emphasised in a number of places (e.g. Castree 2010; Taylor et al. 2015; Taylor et al. 2013).This literature tends to focus around the impact of global supply chains on workers from the point of view of describing how they have led to deteriorating working conditions

and close surveillance at suppliers' workplaces (Taylor et al. 2014; Pun & Smith 2007). Empirical studies of this are mainly concerned about matters of workers' rights and working conditions, particularly in relation to working hours, workplace safety, wage levels (and whether they are correctly calculated and regularly paid) and the level of work intensification. This focus on labour has led to a distinction between 'economic upgrading' (where firms enhance their competitiveness at the level of improved efficiencies and expanded capabilities) and 'social upgrading' in terms of improved labour conditions, increasing labour right and a preferable management-labour relations (Barrientos et al. 2011; Rossi 2013). Research has shown that economic and social upgrading do not go together and firm-level upgrading is often achieved via a simultaneous deterioration of workers' conditions (Selwyn 2013). Although these studies provide valuable insights on how workers are organised and managed in global production systems, they tend to treat workers as passive 'victims' as capital seeks cheap labour (Smith et al. 2002), reflecting and reproducing an orthodox 'labour as object' approach (Bair & Werner 2015). This is problematic because it assumes that a particular governance structure within global supply chains necessitates or correlates with a particular form of work organisation and employment status. It consistently downplays the agentic power of employers and employees in the chain (Bair & Werner 2015).

In response to the critique of the 'labour as object' approach, some studies emphasise the potential agency of workers as active shapers of the structures and strategies inherent to GPNs (Cumbers et al. 2008; Coe 2015). Despite a useful corrective to treating labour in purely objective terms, the 'labour as agent' approach is limited by a conflation of trade union activity with labour agency *tout court*, evidenced by their empirical focus on the collective organisation of workers through labour unions (Lier 2007). Therefore, such a corrective offers limited leverage in understanding workplace practices and relations within

firms where trade unions are weak, informal worker organisation limited and other forms of collective identity such as gender, ethnicity, nationality and/or status may be more salient (Taylor et al. 2015).

Reinforcing this argument, in the recent collection by Newsome et al. (2015), the authors comment that 'the expanded labour-integrated version of the GPN understates the importance of the workplace as a key site for the extraction of surplus. This general oversight is perhaps surprising. One would have expected more to have been written on management control strategies, labour indeterminacy, the immediate wage-effort bargain and worker responses at the workplace level' (Taylor et al. 2015: 14). The present paper, therefore, responds to this call by looking into how supplier firms develop and implement control strategies within global supply chains. These control strategies link the dynamics of product markets and labour markets to the internal structures and conditions under which labour works in order to sustain the profitability of the firm.

The research for this article is based on an intensive, comparative case analysis of two Chinese supplier firms. It draws on in-depth rich data from observation, 140 interviews and archival materials at the supplier firms' workplaces in both China and Japan. Building on Gereffi et al's. (2005) governance framework of global supply chains and Smith's (2006) analysis of the double indeterminacy of labour power, we aim to advance our extant understanding of the effect of global supply chain relationships at work, by developing an analysis of how labour effort and labour mobility are coordinated and controlled by the supplier firms within different forms of global supply chain relations.

The article proceeds as follows. The following section identifies the precise theoretical concerns that this study seeks to address. Specifically, we discuss how to integrate product market conditions with global supply chains analysis in a way that shows the connection to the strategic choice of managers and their use of different control strategies

over labour in the workplace and the labour market. This is followed by a discussion of our research methodology. Subsequent to this, the findings of the empirical analysis are presented. We show that supplier firms have participated in different sorts of product markets and consistently developed distinctive management control approaches in managing both the efforts and mobility of labour. We then discuss the findings in light of their implications for research into the effect of global supply chains at work.

Product markets and management control strategies in global supply chains

In relation to product markets, we propose developing Gereffi et al.'s (2005) governance framework of global supply chains. By intersecting the three supply chain variables of complexity of transaction, the ability to codify transactions, and the capabilities of suppliers, Gereffi et al. (2005) describe, within global value chains, a variety of forms of governance which they describe as 'market-based', 'modular, 'relational', 'captive' and 'hierarchical'. In our view, these forms of governance also reflect different sorts of product markets and how suppliers and buyers can resolve typical product market dilemmas such as ensuring cost efficiency, quality improvement and innovative developments. The 'market-based' global supply chain, governed by price, involves easily codified transactions, simple product specifications and capable suppliers. The 'modular' supply chain involves specialist suppliers and complex products that can be unified and codified in the form of production modules. Supplier firms in this form of chain retain control over the knowledge which they create by black-boxing it into modules. The 'relational' chain exists when product specifications cannot be codified, transactions are complex and supplier capabilities are high. Suppliers and leading firms are mutually dependent in this chain. Close face-to-face interaction and high levels of explicit coordination are needed in order to exchange tacit information; there is sharing of knowledge and high levels of trust that there will not be leakage of jointly created knowledge to competitors. In 'captive' governance mechanisms, 'small suppliers are

transactionally dependent on much larger buyers. Suppliers face significant switching costs and are, therefore, 'captive'. Such networks are frequently characterised by 'a high degree of monitoring and control by lead firms.' (Gereffi et al. 2005: 84). Products may be complex and specific to the buyer, resulting in 'capture' as the supplier would face high costs to find new clients and new products. The 'hierarchy' chain represents the fully internalised operations of the vertically integrated firm.

As managers strategize to enter supply chains in these varying product market contexts, their challenge is to build an internal organisational structure that will maximise their possibilities for gaining contracts that are profitable to themselves as well as to the buyers. One key problem that they have to solve therefore is the problem of putting labour to work within such a context. Smith (2006) suggest two elements to this general problem. The first is managing the work effort bargain around wages and conditions, work pace etc.. Here management can vary their strategy along the direct control-responsible autonomy dimension as discussed in authors such as Edwards (1979), Braveman (1974), Burawoy (1979) and Friedman (1977). Such variations can be internalised within the firm with certain groups of employees having more responsible autonomy (e.g. skilled workers or permanent employees or male employees) whilst other employees are subject to more direct control and monitoring.

The second element is what Smith describes as the problem of labour mobility. Flexibilisation of labour has its limits where employers wish to retain certain skills or qualities. Frequent turnover of employees risks losing investments in training but also in the development of tacit knowledge. Therefore, employers may engage in strategies of 'labour capture', i.e. making it difficult for certain groups of workers to exercise their exit right to move around labour markets, e.g. through non-transferable seniority rules, through the creation of internal labour markets advantaging insiders and keeping out mid-level hires, pension agreements that are relatively non-portable, immigration rules that confine people to

a particular employer etc.. Employers therefore have a range of options open to them in terms of how they utilise the potential for labour mobility amongst their workforce and the degree to which they aim to capture certain groups and limit their exit possibilities.

It is of course important to emphasise that employers are not free to make strategy as they please. As well as the constraints set by product market characteristics, they exist in particular institutional environments where the powers of both labour and employers in the workplace and in the market are shaped by legal regulations, informal norms, mechanisms for implementation and the power and role of the state. GVC/GPN analysis emphasises indeed that outsourcing enables buyers to shop around such institutional regimes until they find one that maximises their benefits. Whilst sellers also may have this internal capacity to shift around if they are of sufficient scale, they are often likely to be more fixed in location and therefore have to become creative at managing their control strategies to overcome potential disadvantages perceived by buyers, e.g. in terms of cost and quality, in order to make themselves efficient and competitive in particular supply chain structures.

To conclude, our argument is that the existing GVC/GPN analysis has underplayed the role of strategic choice, managerial agency and management control systems in identifying how links in the chain are coordinated. In our view, managers in supplier firms have to find ways of managing their internal processes in order to convince buyers that they should have access to particular supply chains. These ways of managing must enable them to deal with the demands of the buying firm in terms of the sorts of products which it requires and what this means in terms of how the relationship between the two is to be governed. Finding these ways of managing requires shaping the work-effort bargain and resolving the labour mobility issue in the context of particular institutional settings. In a global environment that is volatile and changing due to economic, financial, political, social and demographic factors, navigating these waters is difficult. The development of management

control strategies thus constitutes a central process through which we understand the dynamics between the varied competitive environments and governance structures of the supply chain (e.g. as elaborated in Gereffi et al. 2005) on the one hand and social relations at in the workplace on the other.

Methodology and Cases

The article is based on case studies of two supplier firms operating in a service value chain. IT services were chosen because they are considered as highly internationalised functions in offshore outsourcing, but beyond the example of India tend to receive less attention than the manufacturing sector in research on global supply chains (Flecker & Meil 2010). The services supply chain between Japan and China constitutes an empirical setting which is largely unexplored. The suppliers are Chinese firms and the buyers are Japanese firms. Both Chinese supplier firms operate in IT outsourcing though one firm is primarily concerned with inputting information for clients, whilst the other also designs software for analysing data. Both firms have been closely involved for two decades in providing outsourced IT services to Japanese companies both offshore (in China) and onshore (in Japan).

One of the firms, Data-Co (anonymised for reasons of confidentiality), is private, whilst the other, Software-Co (similarly anonymised), is established, funded and managerially controlled by a public university, thus constituting a particular kind of state-owned enterprise (see Eun et al. (2006) for a discussion of Chinese university-run enterprises). Data-Co is based in Dalian City in North East China whilst Software-Co was established and remains based in Shanghai. The diversity of ownerships and locations allows us to take account of the internal diversity and variegated nature of Chinese capitalism (Peck & Zhang 2013).

The empirical case study was developed from 2011 in four research sites in both China and Japan: the Chinese workplace of Data-Co in Shanghai, the Japanese workplace of

Data-Co in Tokyo, the Chinese workplace of Software in Dalian and the Japanese workplace of Software-Co in Tokyo. Researching workplaces in both countries allows us to capture the complexity of internationally-operating firms and to understand the interaction between workplaces in different countries.

The focus of empirical study was on how supplier firms manage to meet their clients' requirements whilst making profits, with specific reference to the firms' management control strategies and practices. Multiple research collection methods were adopted including observation, interviews and archival materials. The observation involved the first author working as a HR consultant within Data-Co's Chinese workplace for two months and then in both firms' Japanese workplaces in Tokyo for another two months. The observation generated detailed insights into the general working environments and employees' daily experience at work as well as outside work (the researcher stayed in the employees' dormitory in Japan, so had opportunities to participate in their leisure activities and observed their lives outside work). It also allowed the researcher to draw from a well of 'shared' experiences in the construction of the analysis in the light of the researcher's position as a HR consultant working with the management teams of the supplier firms. The nuance produced by the researcher's fieldnotes was supplemented by 140 interviews conducted during the primary fieldwork in 2012 and the post-fieldwork period in 2013 and 2014 (arranged as follow-up interviews). Table 1 breaks down the interviewees by research site. The entire interview dataset covered all positions in the organisational hierarchy in both firms. The length of the interviews varied from 60 to 90 minutes each. Most interviews were undertaken in Chinese language except seven of them which were in Japanese with the help of an interpreter who spoke both Chinese and Japanese. All interviews were recorded and subsequently transcribed with the exception of seven individuals who preferred not to be recorded. Finally, analysis of archival materials

provided macro-level data on the historical and institutional context of service outsourcing industry and the two case firms since the 1990s.

Table 1: Interviewees by research site

Research sites	Data-Co (Dalian, China)	Data-Co (Tokyo, Japan)	Software-Co (Shanghai, China)	Software-Co (Tokyo, Japan)
No. of interviews	43	15	38	44

The analysis was undertaken in an iterative process, following the chronological collection of the data. We started the first-round data coding by picking out key events, issues and interactions from the interview transcriptions, fieldnotes and archival materials from Data-Co. This was followed by a second round of coding with a view to producing thematic categories, loosely informed by the literature on global supply chain and management control. We then analysed data from Software-Co on the basis of codes generated through the analysis of Data-Co's data. We grouped the events, issues and interactions into the existing codes, and added to or amended these codes to incorporate these additional instances. We repeated this iterative and recurrent process of coding, as an emergent story of the field began to unfold. The analysis of the empirical data is presented in the following section.

Data-Co and Its Japanese Clients

While both Data-Co and Software-Co entered into supply chains by providing customised services to a small number of Japanese firms, they later on developed two contrasting supply chain relationships with their Japanese clients. Relationships between Data-Co and its clients can be described as transactional and market-based as the service required was highly standardised whilst the relationships between Software-Co and its clients fit more Gereffi et al.'s view of a 'captive' governance structure. To illustrate this, we discuss each set of relationships in detail.

Data-Co initially entered into the BPO supply chain based on the founder's personal networks with a small number of Japanese firms. It aimed to maintain long-term relations with these firms by offering customised services and hoped to further develop new clients through existing clients' recommendations. However, in the early 2000s, Data-Co reviewed its strategies and decided to change its supply chain strategy from 'building up long-term, personal-based relations with a limited number of clients' (D-D2), to establishing contractual relations with as many clients as possible. In this market-based GVC, Data-Co offers standardised instead of customised services, emphasises the role of the marketing department in developing new clients, and ends up taking many one-off orders from different clients. In order to survive in this product market, it needs to be highly cost efficient, highly accurate, highly data security conscious, highly flexible (to changing client demands) and highly sensitive to the expectations of Japanese buyers.

There were both 'push' and 'pull' factors that had driven this change. On the one hand, the increasingly mature, transparent and standardised nature of the outsourcing market in Japan enabled Japanese firms to select suppliers through competitive bids in the open market, in which long-term relations and personal recommendations became less important. Such market development 'pushed' Data-Co to review and adjust its initial strategy towards a more market-based one.

This market-based strategy was also reinforced by how the labour market in Dalian was evolving and the opportunities this provided for the company to become more flexible and cost-conscious. Dalian City is a port city in Liaoning province and is the major gateway to China's northeast region. Being less than two hours away from Japan by airplane and a former colonial city of Japan, the Dalian local government has taken a distinct development path since the 1990s, largely relying on providing relatively low-skilled outsourcing services to Japanese organisations. This strategy has led to a booming business cluster of hundreds of

companies providing business process outsourcing (BPO) and information technology outsourcing (ITO) services. In Thomas Friedman's (2005) bestseller 'The World is Flat', Dalian City is described as the 'Bangalore of China'.

This regional strategy has been reinforced with the development of a large population of low-skilled migrant workers from the rural areas of Northern China. These migrants have been able to study in the local Dalian technical schools for one or two years and then seek job opportunities in the cluster. According to the HR manager, there are more than 15 technical schools in and near Dalian City, which provides a large pool of job candidates every year.

Given the availability of low-skilled labour and support from the government in developing low-skilled BPO services, Data-Co finds itself in an appropriate position to provide standardised services to Japanese clients in an arm's length market, focusing on 'winning as many orders as possible' rather than 'making much effort to offer customised services to a few clients'. As the CEO emphasised in a managerial meeting, 'what we provide is essentially quick services with small profit margins' (D-D41). In the long run, Data-Co plans to continue to pursue its strategy in market-based supply chains. As one interviewee confirmed, 'we have the resources as long as the cluster exists. We just need to continue bringing in new clients.' (D-D38)

Recruitment and managing labour mobility

Business in Data-Co largely depends on the season. Every year, the period from August to the following February is considered to be the 'busy season' since the firm gets a large amount of business involving inputting annual reports for Japanese institutions and editing Christmas and New Year cards. March to July is seen as the 'low season', during which the firm and consequently the workers do not get as much work to do. In order to match the predictable peaks and troughs of their business, Data-Co wants its labour to be both available (in the busy seasons) and disposable (in the quiet seasons). In achieving this, three strategies

have been adopted to manage labour mobility. First, Data-Co has secured a stable labour source by recruiting senior graduating students from local technical schools, with which it has developed close collaborations. 75% of them are women. The recruitment (accompanied by the 3 month training period described below) takes place every year and it is strategically scheduled before the busy season every year, so that there is enough 'hoarded' labour for the coming business. New student recruits have to finish a one-year internship assignment before they can sign a standard three-year employment contract with the company. These interns are paid at a much lower wage rate (at 400-600RMB per month) than that of the established workers and the mid-career entrants (normally at 1,100–3,000RMB per month). The use of student interns reflects the move of the Chinese employment system from a state-centric to a more fragmented market-centric one, featuring a greater degree of informalisation and deregulation (Friedman & Lee 2010; see als Smith & Chan 2015 for a more detailed analysis of the use of interns in China).

Second, Data-Co manages to achieve a certain level of labour flexibility and cost efficiency by 'letting' workers voluntarily leave for other companies during the low seasons, without making much effort to retain them. This is achieved by implementing a pay system which minimises the fixed basic pay whist emphasising variable piece-rate bonus. On the one hand, the fixed basic pay only accounted for 40% for the employee monthly income (corporate report, 2013). Informants noted that the fixed basic pay in Data-Co (avg. 800RMB) was clearly inferior to the best rates in the cluster (avg.1000RMB). On the other hand, the amount of piece-rate bonus depends on the amount of orders the company can get. Workers got well paid during the busy seasons when they had lots of overtime opportunities. This, however, meant that during the quiet season when workers were not doing overtime, pay was particularly low, leading to people leaving the company at that time – which in turn

reduced costs to the firm. One informant reflected, 'we stay during the busy seasons and we are free to job-hop during the low seasons to secure a higher basic pay' (D-D12).

Notably, even the so-called 'fixed' basic pay is not stable and guaranteed. This is because workers are required to take a skill exam every June, regardless of their length of service, and the exam results will decide their basic salaries for the upcoming year, in a distribution determined by management (Table 2). This uncertainty about future earnings also results in more employees 'voluntarily' leaving the firm both because they are dissatisfied with their upcoming basic salaries and with their inability to secure a particular grade (and associated wage) over longer than one year at a time.

Table 2: Distribution of scores and basic salaries in Data-Co

Score	0-50	51-70	71-90	91-100	above 100
Grade	grade 1	grade 2	grade 3	grade 4	grade 5
Basic salary (in RMB)	600-699	700-799	800-899	900-999	1000-1100
% of employees*	5%	50%	25%	15%	5%

Source: Interviews and corporate documents.

* % of employees is based on estimation. The HR manager said that the markers are expected to maintain this distribution so that the wage bill for the company does not fluctuate too much resulting in individuals employees having to bear the risk and uncertainty that their basic wage may go down in any particular year.

Workers in Data-Co are used to the idea of moving to jobs in other companies as the existence of the local cluster of BPO companies in the area provides ample job opportunities; as one interviewee stated, 'I move around in the cluster depending on which company gets big orders and needs people'(D-D25). However, gender and age appear to underpin variations in turnover. HR statistics show that 70% of workers who have been serving for more than five years are married females. Many women explained that they prioritised employment stability over salary after marriage in order to focus on family and childcare. A small number of them attributed this to age, suggesting they had limited outside choice as

they got older and the physical demands of the inputting process became more difficult. One 38-year old senior worker reflected that 'experience does not count in BPO. The younger, the quicker, the more choices you have.' (D-D28)

Third, maintaining labour flexibility in this way was facilitated by a well-established and short-term training system, through which the inexperienced recruits are trained to be qualified semi-skilled workers within three months. Data-Co's training programme exclusively focuses on the basic skills of typing Japanese characters, letters and numbers. Interns are taught to use an application, which enables them to type Japanese characters based on their structures (appearances), rather than on pronunciations or meanings. In this way managers demonstrate that 'the company is able to train workers within three months to become semi-skilled workers, even if they know neither Japanese nor about computers before they join' (D-D10). One worker recalled her experience:

> I knew little about Japanese... We were taught a few Japanese words in order to use the operating system in the Japanese language. Then we were trained to type Japanese without knowing its meaning and pronunciation. After we learnt to type Japanese correctly, the instructors gave us a large amount of practice in order to improve our input speeds and accuracy. We kept practising every day, until we met the standards of the final test. (D-D17)

These three approaches to managing labour mobility have enabled Data-Co to focus on short-term profit maximisation without engaging in large and long-term investments in recruitment, training and labour retention. This is considered to be crucial for the survival of private enterprises in China, which compared to state or quasi-state enterprises have little access to bank loans and thus have to operate under hard budget constraints, relying on self-accumulated capital (Tsai 2002; Rothman 2005). As the CEO confirmed, 'we need to secure a healthy inflow every month to pay for our employees.' (D-D1)

Managing labour effort

The use of semi-skilled employees with limited training in a context where the Japanese buyers of services expected high levels of efficiency and reliability, however, posed problems for the company as their clients expected them to achieve 100% delivery accuracy, i.e. after checks and corrections though as one manager explained this is measured loosely on the feedback from clients after delivery; 'as long as the clients do not identify any mistake after delivery, we assume that the delivery accuracy for this project is 100%' (D-T3). However, this is built on a much more stringent monitoring at the individual level where the degree of first-time accuracy of the input is recorded in each individual's performance chart every day and used for internal evaluation, improvement and employee training. How can Data-Co achieve high levels of both delivery and first-time accuracy with semi-skilled workers inputting data in a language in which they have only had three months training? The answer is that they operate a very intensive form of direct control over the employees.

Delivery accuracy is controlled through a work procedure, which is called the 'double input and multiple checks' system. Under this procedure, every piece of work needs to be input twice by two operators respectively, followed by a three-fold checking process including a comparison check between the two inputs (by team leaders), a sample check (also by team leaders) and a final check before delivery (by project managers). Mistakes identified during the comparison check and the sample check will be corrected immediately. Failure to be accurate will be logged on the individual's performance chart. If there is any problem identified during the final check, workers are likely to be asked to re-do the whole work.

Second, the performance of the individual employee is monitored through the collection of data on first-time accuracy. Every operator has an individual chart on which his/her daily performance, such as the quantity of work and the number of errors, is recorded by his/her team leaders every day. Since the team leaders are in charge of all comparison

checks, they are expected to observe the mismatch during their work and identify the individual responsible for each error. Once they have identified the operator who makes the error, they will record this on this member's daily performance chart. According to company policy, operators are given penalties for every single error they have made. The amount of the penalties for each error is informed by the nature of the project, and it is usually set and announced by the project manager before the operators start working on this project. By the end of each month, the team leaders multiply the set penalties for each error by the total number of errors that have been recorded for each operator and work out the total amount of penalties for each operator. They then submit this result to the HR Department and the HR staff will subtract the penalties from each operator's monthly pay.

In the daily operation of the workplace, the direct control over employees is reflected also in the effort to tightly structure the working day which is arranged according to a bell-controlled timetable. Throughout the day, the bell rings 10 times to notify workers of working, breaks and meetings, as shown in Table 3. Team leaders work in the same operating rooms as their members and monitor their behaviour closely. Operators are required to sit at desk during working time. They are not allowed to chat with each other and should ask for permission if they need to leave. Overtime is common especially during the busy seasons. Although overtime is voluntary in principle, workers who refuse to take overtime work without reasonable cause are seen as undisciplined and unmotivated, and they are likely to be low-rated for promotion.

Table 3. The bell-controlled timetable in Data-Co

Time	8:30	10:00	10:15	11:30	12:30	14:00	14:15	16:00	17:15	17:30
Acti-vity	Work	break	work	lunch break	work	break	work	break	daily meet-ing	leave work

Interestingly, these procedures were partly functional and partly ceremonial. Lower level supervisors had some discretion in terms of their punishments and control so long as output maintained 100% delivery accuracy which given the amount of double checking

which occurred was likely to happen anyway. However, as one informant made clear, it was important to show Japanese buyers that the company has set high standard for its services and employees. This interviewee stated, 'what can be more convincing than showing our clients this work procedure and telling them mistakes could hardly be missed under this procedure?' (D-D15). However, it is relevant to note that according to the interviews, Japanese clients concern themselves with whether the suppliers have covered all the details and rules existing in the paperwork but pay little attention on how these rules are carried out in practice. Our informant reflected:

> During the visits, they [Japanese clients] walk around the building and take a look at our operating rooms. They do not normally ask to enter into the operating rooms. They just have a look through the windows. Frankly, the observations through these visits are superficial. They do sometimes ask us how certain rules are carried out orally, but they don't check in practice. (D-T12)

The main concern of the Japanese clients is delivery accuracy, i.e. output control, rather than procedural control. Nevertheless, their occasional presence in Data-Co.'s workplace is used to reinforce the system of direct control and surveillance which is established.

In relation to our Data-Co case, we see that in order to win and sustain a profitable business, Data-Co management have to develop control strategies which meet the requirements of the product market and the supply chains in which they are located. In this case these requirements are for cost efficiencies, high levels of delivery accuracy, and the ability to deal with peaks and troughs of business. In order to meet these requirements, they have moulded a control system which combines a workplace regime based on high levels of direct control, highly segmented work with a labour mobility regime that provides the firm with the flexibility in terms of numbers of employees to meet peaks and troughs. All this is

managed also through a recruitment system and a wage payment system which keeps costs low in spite of high levels of labour turnover.

Software-Co and Its Japanese Client

Like Data-Co., Software-Co also started into the outsourcing business with a small number of Japanese clients. However, instead of developing high volumes of new clients as Data-Co does, Software-Co now devotes itself largely to one single client, from which it gets almost 90% of its total business. Since 2001, Data-Co has gradually terminated contracts with other existing clients and stopped developing new clients. It has been concentrating on building a long-term, particularistic relationship with the Nomura Research Institute (NRI), a well-known Japanese firm operating in the fields of consulting, financial IT solutions and IT platform services. In doing so, Software-Co restructured its work procedures and systems in order to better adapt to the complex and specialised products in NRI. Such idiosyncratic changes and investments helped Software-Co retain its orders from NRI, but confined the company virtually to working only for NRI, as one senior developer explained:

> NRI has its own specifications for products in terms of the programming language, platforms, procedures and systems. For instance, we were required to use 'Cobol' programming. It is an outdated programming approach which most people do not know. Therefore, we have to train our programmers to use this particular approach, but it is unlikely to be used for any other clients. (S-S23)

In contrast to the market-based supply chain relationship which featured with Data-Co, the relationship between Software-Co and NRI can be characterised as a captive supply chain relationship (Gereffi et al. 2005). That is, Software-Co is highly dependent on the client and faces big losses if it fails to keep receiving business from the client. This was particularly evident when the 2008 global crisis caused tremendous cutbacks in demand for outsourcing

from NRI to China and consequently led to a severe stagnation of business in Software-Co and a massive reduction of in some areas of staffing, by almost 50%.

Software-Co's choice to develop a relationship with one single client, rather than market-based relationships with many clients, is closely related to the company's origins. Although Software-Co was established in 1991, it only started receiving business orders (and generating revenues) from Japanese firms in 1996 and did not fully engage in outsourcing business until 2001. Between 1991 and 2001, Software-Co primarily focused on running a training programme in collaboration with the Japan International Development Organisation (JAIDO). In this programme, selected Chinese university graduates were sent to Japanese firms for a minimum of three years and received on-the-job training (OJT) in the fields of software design, development and programming. The initiative of this training programme was seen by the University as 'a response to the Chinese State's call for developing high-tech industry and high-skilled talents' (S-T1). The training program was partly funded by the state through the university and partly funded by JAIDO.

Through running this training programme, Software-Co accumulated a good number of well-trained software developers, who spoke both Japanese and Chinese and had experience in working in Japanese firms. By the end of 2000, Software-Co had had about 120 well-trained and highly skilled software developers in its Chinese workplace. In 2001, JAIDO exited from the collaboration, which announced the end of the training programme and Software-Co became a full contractor of software services for Japanese companies.

Given its distinctive advantage in human resources with high levels of competence in Japanese language etc., Software-Co developed a strategy to enter global supply chains that required relatively higher value-added and customised software services focused on Japanese clients, starting with a small number of big clients and eventually concentrating just on its NRI business. Software-Co stressed the importance of getting deeply involved with NRI to

better understand its working procedures and management systems and develop solutions that can best fit with it. Many interviewees highlighted that developing particularistic relationships with clients could make use of the firm's competitive advantage in skilled employees:

> We considered two alternative strategies. The first was to downgrade and to focus on pure coding and programming. This would bring us more clients but it's low-skilled. The second was to upgrade, in which case we would develop expertise in software design and enhance our capacity to make ourselves important and necessary to NRI…We decided to choose the latter in the end because we had these well trained developers and it is a waste of human resource if we make them do all the standardised coding and programming work. (S-S3)

In 2010, senior managers in Software-Co re-assessed its strategy and set a long-term vision, which focused on providing higher value-added and more customised system solutions. The aim was to improve the firm's capability and increase the mutual interdependence between the clients and itself. As the manager explained, 'we want to be also to provide distinctive solutions to our clients so that our clients rely on us as much as we rely on them' (S-T-2).

Product wise, Software-Co provides a 'package' of services including both software design, which requires close liaison with clients, and software programming, which involves monotonous coding and testing. As we will discuss below, such services have led to two different employee groups within Software-Co: software design is conducted by software developers while programming is carried out by software programmers. Software developers and software programmers work together in task-based teams. The work procedure is described as a 'water flow' which starts from software design and can only move to the phase of programming after the design stage has been completed. The team leaders are all developers and they have the greatest responsibility for the team operation. The span of

control is always between twenty to thirty junior software developers and programmers under a team leader.

Recruitment and managing labour mobility

Despite the end of the international collaboration, the recruitment and training programme of the software developers has continued in the same manner. Specifically, software developers are selected from the top four universities in Shanghai (the company's home base). Being owned by the university has given Software-Co easy access to the best graduates. Once hired, developers are provided with a systematic training for a minimum of five years. This includes one year of off-the-job language training at university, one year of OJT at the Shanghai headquarters, and three years of OJT in Japan at their clients' workplaces. During the first year, trainees learn nothing technical, but only the Japanese language. The Japanese lessons are held at the university and are given by university lecturers. At the end of this period of study, those who are certificated at the highest level (N1) of the Japanese Language Proficiency Test are able to start the second phase of training in the Chinese workplace. At this stage, trainees are assigned to different teams and told to observe and learn the basic procedures and techniques involving in software programming and design.

After preparation relating to both language and basic skills, trainees are then expatriated to Japan and given three years of OJT in Japanese clients' companies. It is worth noting that before trainees leave for Japan, economic control is exerted in order to guarantee a trainee's return. Trainees have to sign a legal agreement with the company before they leave for Japan, agreeing to serve the company for at least five years after they complete their training in Japan. Those who fail to fulfil this commitment have to pay the company liquidated damages of 100,000RMB. The lengthy training and the financial constraints after the training mean that once hired, these developers are locked into 10-year contracts (5 years training and 5 year post-training with major financial penalties binding software developers

to the firm). Thus the company seeks to ensure that it does not lose the major investment it has made in training the software developers. After the training, developers can choose to either continue to work in Japan with clients or return to Software's Chinese workplaces, normally leading a group of programmers. In either case, the developers continue to focus on software design work.

Besides the training programme and the legal agreement, the nature of work and employment in Data-Co has also contributed to the immobility of software developers. First, the systematic training programme develops a homogeneous and isolated group of employees who not only accepted but indeed very much appreciated the existing corporate culture and work environment. This is most evident during the developers' expatriations in Japan. The collective accommodation in Japan, the stressful long working hours at the same Japanese workplaces, the homesickness and anxiety about working and living in a foreign country push these employees to rely on each other in both work and life. They see each other as the best of colleagues, friends and even as family. They spend most of their time within their 'comfort zone' with each other, to the extent that they lose opportunities and motivation to socialise with other people. Second, salaries of software developers are at the top of the market. There also exists a structured internal career path through which developers pursue career progression. Combined, these features constitute a working situation which is seen by many developers in Software-Co as being too comfortable to leave. Third, the skills they learnt in Software-Co are highly firm-specific and therefore unlikely to be very helpful in their job hunting. These restraints limit developers' outside choices. Indeed, company statistics show that between 2005 and 2010, no single developer quit after completing training.

The privileged treatment of developers creates a strong sense of elitism, in sharp contrast with the other group of lesser skilled employees within the companies (known as

'software programmers'). The recruitment of programmers did not start until 2001 when they were hired to carry out routinised programming and coding tasks to allow developers to concentrate on the higher value-added work of software design. In contrast with developers, programmers are sourced from various channels including universities, local job centres, job agencies and personal recommendation. They are selected based on specific skills, experiences and qualifications in computer-related areas. No training is provided to them and they only work in the Chinese workplace. While the developers are considered metaphorically as computers in which the company is willing to invest good software (by its long-term training), programmers are expected to be 'plug-and-play devices' which can be used immediately after recruitment. The absence of training poses challenges to the programmers, especially the newly-hired ones. One new programmer said that she had to learn the Japanese language in her spare time in order to use the operating system which is displayed completely in Japanese. Yet, she received no support from the company.

Programmers are paid a monthly salary which is also determined by their length of service. In contrast to the top level salary of developers, the salary rates for programmers are below the industrial average and many programmers are not satisfied with their earnings. Whilst developers have a clear career path based on internal promotion, programmers have little career prospect within the company since all managerial positions are taken by developers. Given this, many young programmers use Software-Co as a springboard for their careers, and expect to leave for another company as soon as they accumulate some experience. In effect they are disposable labour, paid at a low rate to do standardised tasks and easily replaceable. Not surprisingly, then, average turnover rates among programmers were above 50% every year with the rate among male programmers about 60% per year compared to 15% amongst women. Again, the female programmers thought that although the

career development was limited in Software-Co, they were compensated by the stable work and incremental salary increases, which enabled them to care for family and children.

Managing labour efforts

As in Data-Co, the management of labour effort in Software-Co has focused on delivering high quality services to Japanese clients. Specifically, this involves a series of management control approaches that differ significantly between developers and programmers.

Systematic OJT at the sites of the Japanese clients is considered the best way to equip developers with the knowledge and capabilities to deliver high-quality work that best meets clients' requirements. During the OJT, developers are trained and supervised by both Japanese clients and Software-Co's Japanese office. They are assigned to a team in the Japanese clients' firm. They are given tasks and allowed access to all information. Each developer is allocated to an experienced member of staff in the Japanese client who works as a coach and provides instructions to help them learn skills and processes. Under such arrangements, developers are considered as the learners and eventually carriers of 'Japanese' knowledge and practices. They are provided sufficient time and opportunities to acquire and accumulate knowledge of Japanese management, to adopt Japanese practices in their daily work, and to update their experience and perceptions about Japanese management during their socialisation with Japanese colleagues and clients. This first-hand knowledge and experience of Japanese management builds a strong relationship between the Chinese supplier and the Japanese client in terms of confidence in the ability of Software-Co to deliver to the level expected by the Japanese firm.

This confidence is reinforced by an acknowledgement on both sides that part of the role of training in Japan is to ensure that Japanese procedures and standards are brought back to China and are implemented there as quality control measures. Such procedures and standards included a suggestion system, which encourages developers to give constructive

suggestions to improve the existing systems; a knowledge sharing program aimed to accumulate knowledge through developers' sharing and improving the capabilities of the firm in dealing with complex systems; and a *Hansei* system which requires individuals to be open to the negative feedback from colleagues, reflect on and learn from their own mistakes. All these practices resonate with the philosophy of *Kaizen* (continuous improvement) in Japanese companies, and emphasise employees' active participation in improvement and problem solving.

In fact, given the extensive training offered to the developers and their deep involvement in Japanese companies, high-quality and customised design has always been the competitive advantage of Software-Co. Developers are often considered as a group of people who are experienced, hard-working, reliable, highly committed and capable of accomplishing predictable results. In the day-to-day operation, developers are given plenty of discretion to exercise their judgement in actual implementation and they are responsible for the quality of their own designs. This is partly because of the intangible and interactive nature of their tasks, and partly due to the trust that has been built up through the training. The project managers work as facilitators rather than monitors, encouraging participation and the delegation of responsibility and accountability. As a consequence, the work discipline among developers is generally experienced as loose and flexible, representing a case of 'responsible autonomy'.

Once the software design is settled, however, programmers start converting the design into lines of code and conducting tests. For programmers, high-quality work means that the codes are in complete accordance with the design and are accurate. Unlike the developers who enjoy considerable autonomy during work, programmer's work is tightly specified and monitored, particularly through the requirement to follow the manual strictly. The manual is a minutely prescribed guide book on how to test each code. It includes long lists of items which

need to be tested as well as a detailed instruction on how to test each item. In practice, programmers need to submit a testing sheet after each test which is designed completely according to the manuals. For each item, they need to tick the box to confirm that it has been tested and also fill in the expected and actual results. The quality of testing report is evaluated by the team leaders (who are developers) and it forms an important aspect in programmer's performance assessment. In contrast with the developers' work which requires high levels of technical and interpersonal skills, programmers' work is usually experienced to be repetitive, monotonous and formalised. In this sense, many programmers described themselves as 'IT coolies' who are dealing with low-skill work in IT industry and lack core competencies in the labour market.

In sum, Software-Co has developed a management control system that is bifurcated between developers and programmers. Management of developers is mainly achieved through 'soft' approaches and responsible autonomy through for example, employee training and high levels of employee discretion. These employees are key to maintaining the relationship with the client. They are highly knowledgeable about how the client works and what the client's expectations are. These developers are a highly valuable resource in keeping the business in the supply chain and they are held tight by the company through its seniority rewards system and its penalties for early departure. The elite status of the group also reinforces these rewards and makes them dominant within the company. However this is a highly costly strategy and only works because it is combined with the employment of relatively low skilled programmers managed under conditions of direct control and paid relatively low wages. Once again it is the ability to manage these internal dynamics and labour market aspects that enables the supplying firm to meet the product market demands of its client.

Discussion and Conclusions

In this section, we compare our cases in order to clarify the theoretical contribution which we wish to make. We follow this through with a summary of the key additions we wish to place into the debate on GVCs/GPNs.

In relation to our cases, we deal firstly with the similarities. In this respect the most important to our argument is that in order to participate in global supply chains in a way which both meets the requirements of clients and enables the firm to make a profit, the supplier firm has to develop a distinctive managerial control strategy. This reflects the growing emphasis within the literature (e.g. Coe & Yeung 2015) on the strategic choice involved in developing supply chains. We find that in both cases, managers combine strategies in the workplace to control different groups of employees with a strategy towards the issue of labour mobility (as discussed in Smith 2006). Within the workplace itself, we find that direct control is a significant feature of both contexts though in Software-Co, this is combined with a strategy of responsible autonomy aimed at the software developers. In both cases, managers of the supply firms are aiming at controlling the workplace not just for functional reasons but also as part of their strategy for maintaining their relationship with Japanese clients. Thus both firms studied were keen to impress their clients when they are on site with them in Japan or when clients visit the Chinese locations that they are aware of the high standards required of them. In Data-Co, there is an element of 'performance' in this as they know that their clients are more concerned with checking paperwork and procedures than actually observing in detail workplace practices. In contrast, in Software-Co, the elite group of software developers are thoroughly socialised into the Japanese way of working by their three years training on site in Japan. Therefore, the overall ethos of the company is to draw on Japanese work practices and procedures, though in the case of the less skilled programmers, conformity is more likely to be secured by direct control techniques. Nevertheless, there is a common 'dominance' effect (Smith & Meiksins 1995) at work in

both cases in that the Chinese suppliers see Japan as the more advanced country in terms of management techniques such as quality improvement, reliability etc., and therefore do not resist the imposition of Japanese standards, even if, in the case of Data-Co, there is some 'ceremonial' conformity. Rather they are happy to learn about these practices and discourses, in the case of Data-Co as it improves their business position vis-à-vis other potential Japanese business and in the case of Software-Co because it reinforces their elite status and distinctiveness from other Chinese competitors.

Although there are some significant regional differences between Dalian and Shanghai (see, for example, the discussions on regions in Breznitz & Murphree 2014 and on China as a form of 'variegated capitalism' in Peck and Zhang 2013), both regions continue to produce large numbers of semi-skilled graduates of technical schools and colleges. This enables both companies to manage their semi-skilled data inputters and programmers with a high degree of flexibility, such that they can respond to peaks and troughs in business by losing or gaining employees relatively easily without having to pay premium rates. By contrast, Software-Co's software developers coming from the top Shanghai universities are in very tight labour markets, yet the company succeeds in locking them in by a combination of providing elite status and high levels of training plus a good payment package together with restrictive labour contracts. It therefore has very low turnover amongst a group that potentially has many opportunities open for it in Shanghai's dynamic technology sector. Thus both companies operate in similar labour market conditions characterised by the shift in China from state control to labour contracts that are relatively deregulated and increasingly shaped by market conditions.

The main difference between the companies is the product market in which they are located. Data-Co offers simple data input services, whilst Software Co is primarily a software development service which offers a programming service as well. This difference is informed

by the historical and institutional contexts in which the supplier firms are located. Data-Co competes on price as well as quality and reliability and is therefore in a highly competitive marketplace looking for a range of clients. In Gereffi et al's terms its position in the supply chain is governed by the market, though as this paper describes this is only a partial view because it conceals the degree of managerial effort that has to go on within the company to satisfy the demands of the client. Software-Co has decided to predominantly become the supplier for one firm, NRI. It has invested a huge amount in this relationship, not least through the amount of time and effort which its trainee software developers undergo inside the Japanese sites of NRI. In this sense, it is what Gereffi et al describe as a 'captive' governance structure, though Software-Co is trying to strengthen its position in the chain by increasing the degree of interdependence between NRI and itself.

These differences feed into the different management control strategies that the two Chinese companies have developed. The importance of managing the relationship and the expectations of the client in the case of Software-Co has been resolved by the creation of the group of software developers who learn in a deep way what it means to be Japanese in terms of expectations, procedures and practices. This helps them continue to meet the complex and often tacit or implicit requirements for the software which their clients wish them to develop. Continuously managing these expectations requires that the software developers exercise 'responsible autonomy' using their own discretion and skills to resolve problems as and when they arise. Data-Co on the other hand provides some minimal training in Japanese language and mimics some Japanese techniques but the key to meeting the client's expectation is the use of direct control and highly labour intensive double and sometimes triple checking of data input to reach a 100% reliability criterion. In a Japanese context, the individual worker would be expected to reach this standard but in China it is recognised that this will not

happen. Fortunately, from the point of view of management, labour is cheap and flexible to allow this 'overstaffing'.

The ownership-types have implications for the strategic choices in supplier firms. Since the official sources of credit of China are dominated by the state and adopt a lending policy which is biased in favour of SOEs, private companies such as Data-Co are pushed to focus on cost-reduction and short-term profit maximisation, rather than long-term value creation. This consequently reinforces control strategies highlighting labour flexibility and intense surveillance. By contrast, Software-Co, as a university-owned company connected to the state, has easier access to bank loans and that supports its long-term strategy and helps the company to continue to offer lengthy and expensive training programmes for developers, even after the company's transformation from a training agency into an outsourcing company in 2001. The ready resources available in the university also give Software-Co access to the graduates and enable it to provide developers with one-year systematic Japanese language training at the university.

Employee gender plays a role in the management of labour mobility. In both companies, many female employees, especially those who are married, tend to prioritise job stability over salary and career development. Therefore, they appear to be more tolerant of the unsatisfactory wages and slow promotion opportunities, and are less likely to use their 'labour mobility' power. This is in line with the overall 'male-breadwinner' model which remains dominant in China in spite of high levels of female participation in the economy: women are expected to take on more responsibilities in family care, and men to earn more money (Cooke 2005; Gottfried & O'Reilly 2002). These female employees are normally in low-level positions such as shop-floor workers in Data-Co and programmers in Software-Co. Female employees in the middle- and top-level positions do not show such tolerance.

In conclusion, our paper began from the relative neglect in GVC/GPN studies of the question of management control strategies. GVC/GPN has generally been satisfied with identifying the nature of the linkage between the supplier and the buyer. What it has not sufficiently considered is how the capabilities of the supplier and the demands of the buyer are translated into management control strategies within the firm, especially the supplier firms. Such neglect is problematic because the continuity of supply chains relies on whether supplier firms and their employees can keep meeting the dual imperatives of client satisfaction and profit-making. Failure to achieve this will result in the 'disarticulation' of supply chains in which firms and their employees may find themselves ejected entirely from the chain as comparative advantages are lost to other places (Bair & Werner 2011). Here our paper revealed that to make these linkages work, firms have to exercise strategic choice in how they manage labour. We have emphasised that the supplier firms have to resolve both the effort bargain and the issue of retaining (or flexing) the required form of labour. On the effort bargain, we have suggested it may be useful to return to some basic concepts of management control such as 'direct control' and 'responsible autonomy', both of which we saw operating in our cases. On the labour mobility issue, we revealed that the companies were in an institutional and labour market context where it was relatively easy to maintain flexible control over numbers of semi-skilled employees but strategies for developing and keeping highly skilled employees (the software developers in Software-Co) required more complex arrangements because these employees were so central to ensuring that the 'captive' governance structure did not just lead to the exploitation of Software-Co but to a form of interdependency. Our cases show the importance of moving beyond simple typologies of governance with a deterministic emphasis and instead recognising the importance of management and employee agency in making supply chains work. Linking GVC/GPN

analysis to a better understanding of management control strategies inside the firms will add a new dimension to this research agenda.

Notes

[1] We recognise the debate on the differences between various analytical frameworks including global commodity chains (GCCs), global value chains (GVCs) and global production networks (GPNs) (see Bair 2008). For the clarity and coherence of constructs, we adopt the generic 'supply chain' terminology in this paper.

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